The Clean and Efficient Use of Fossil Energy for Power Generation in Thailand

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1999 Thailand Total Energy Used

Energy	Quantity (BBL/Day) (Crude Oil Equivalent)	Percentage
Petroleum Products	611,174	54.0
Natural Gas	336,248	30.0
Coal	40,997	4.0
Lignite	117,558	10.0
Hydro	19,046	2.0
Total	1,125,023	100.0

Source: NEPO

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Unit Cost of Energy

Energy	Unit Cost (Baht/ Million Btu)
Diesel	400
Fuel oil	230
Gas	120
Coal	65

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Energy Used for Power Generation in Thailand

(%)	1999	2001	2006	2011
Gas	61.3	73.0	67.0	58.0
Fuel Oil	16.6	3.8	2.8	2.7
Diesel	0.5	0.5	0.0	0.0
Coal	**14.8**	**16.1**	**24.4**	**27.3**
Hydro	4.2	3.8	3.8	3.0
Purchase from Laos	2.6	2.8	2.0	9.0
Total	100	100	100	100

Source: Egat's Power Development Plan

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Use of Coal in Existing Power Plant

Mae Moh Power Plant

- **2,625 MW Power Generation**
- **Consumes 15 - 16 Million Tonnes of Coal per Annum or 80 % of Total Coal Used for Power Generation in Thailand**
- **Heating Value of 2,600 - 2,800 Kcal/kg with 2.7% Average Sulphur Content**

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The Clean and Efficient Use of Coal for Power Generation

- Coal Sourcing
- Coal Transportation
- Coal Utilization

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Coal Sourcing

- Good Quality
- Diversified Sources

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Coal Sourcing
Comparative Quality of Coal Sources

Country	Sulphur Content (%)	Heating Value (Kcal/kg)	Percentage
USA	0.10 – 0.44	4,442 – 6,567	18.70
	0.45 – 0.70	4,872 – 7,331	11.30
	0.71 – 4.20	5,015 – 7,880	70.00
AUSTRALIA	0.30 – 0.44	5,920 – 6,950	25.50
	0.45 – 0.70	6,185 – 7,020	57.50
	0.71 – 1.29	6,250 – 7,100	17.00

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Comparative Quality of Coal Sources

Country	Sulphur Content (%)	Heating Value (Kcal/kg)	Percentage
INDONESIA	0.10 – 0.44	5,500 – 5,900	18.20
	0.45 – 0.70	6,000 – 6,900	27.20
	0.71 – 4.20	6,243 – 6,800	54.50
SOUTH AFRICA	< 0.45	0	0.00
	0.45 – 0.70	6,624	100.00
	> 0.70	0	0.00

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Comparative Quality of Coal Sources

Country	Sulphur Content (%)	Heating Value (Kcal/kg)	Percentage
CHINA	< 0.45	0	0.00
	0.45 – 0.70	0	0.00
	> 0.70	6,600	100.00

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ASIA
Japan
China
India
Philippines
Papua
New
Guinea
Australia

Coal Transportation

- MV Eastern Power
  - 65,000 Metric Tonnes Capacity
  - Self-Unloading Facility
- Port Facility

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EASTERN POWER


EASTERN POWER
PORT VILA

Coal Utilization

- Proven Technology
- Sufficient Investment

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EXAMPLE
The Cogeneration Public Company Limited
(COCO Phase III)

- COD: March 2000
- 514 MW Power Generation
- Hybrid Cogeneration - Multiple Fuel Technology (Coal/Gas)
- 210 MW Gas Fired Power Generation
- 304 MW Coal Fired CFB Boiler Power Generation
- Imported Coal with Average Heating Value of 6,000 Kcal/kg and < 1 % of Sulphur Content

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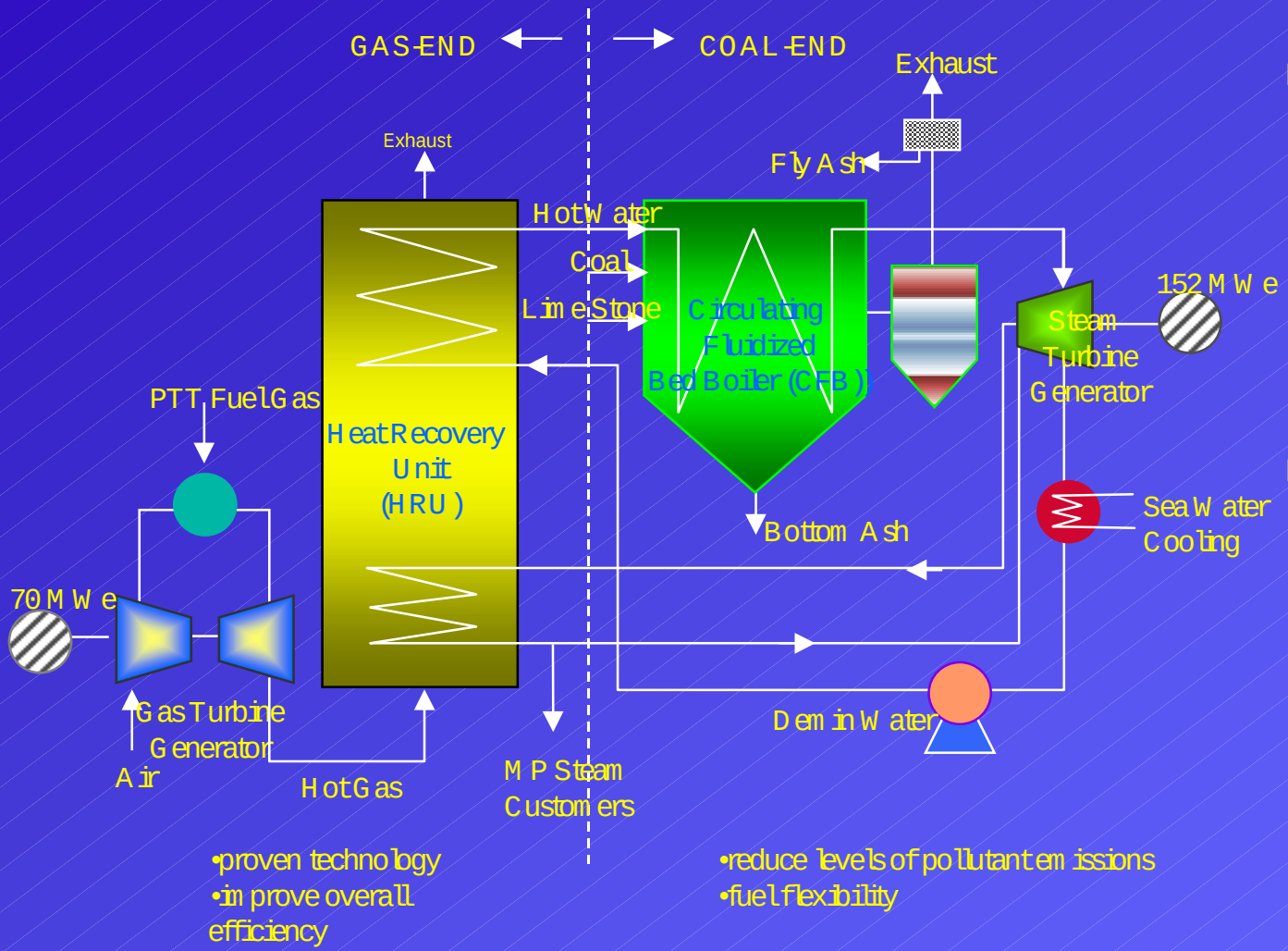
HYBRID COGENERATION PROCESS



- Hybrid cogeneration enables COCO to use low cost coal to increase efficiency, thereby reducing long-term fuel costs.
- Hybrid technology is relatively new, but has already been used in successful commercial operations in Europe.

Emission Released By COCO Phase III

Air Quality	Gas End Unit	Coal End Unit
SO2	< 0.1 PPM.	< 200 PPM.
NO2	< 35 PPM.	< 100 PPM.
TSP	< 0.3 mg/Nm3	< 20 mg/Nm3

Country Standards

Air Quality	Gas	Coal
SO2	20 PPM.	320 PPM.
NO2	120 PPM.	350 PPM.
TSP	60 mg/Nm3	120 mg/Nm3

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BLCP Power Limited

- **Expected COD: October 2006**
- **1,400 MW Power Generation**
- **Coal Fired FGD Technology**
- **Imported Coal with Heating Value 5,800 - 6,700 Kcal/kg and 0.45 % Average Sulphur Content**

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Emission Released By BLCP Power

Air Quality	By BLCP
SO2	262 PPM .
NO2	241 PPM .
TSP	43 mg/Nm3

Air Quality	Country Standards
SO2	320 PPM .
NO2	350 PPM .
TSP	120 mg/Nm3

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THANK YOU

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